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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,299	06/02/2005	Hideki Umetani	018765-220	1708
21839 7590 03/12/2007 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			EXAMINER KATAKAM, SUDHAKAR	
			ART UNIT	PAPER NUMBER
			1621	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/12/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/537,299

Applicant(s)

UMETANI ET AL.

Examiner

Sudhakar Katakam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/2/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The examiner has considered applicant's Information Disclosure Statement of 2nd June 2005. Please refer to the signed copies of the PTO-1449 forms attached herewith.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

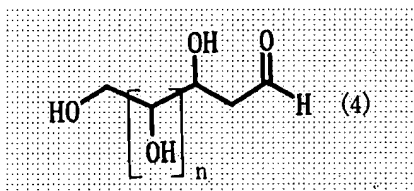
3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

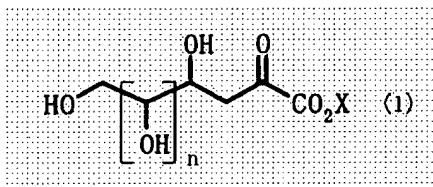
4. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Heikkilä et al** [US 6,894,199] in view of **Ooi et al** [Australian Journal of Chemistry, 2000, 53(3), 171-174], **Garegg et al** [Carbohydrate Research, 1988), 176(1), 145-8], and **Rylander et al** [Hydrogenation Methods, Academic press, 1985, pages 66-77].

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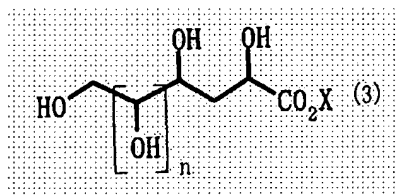
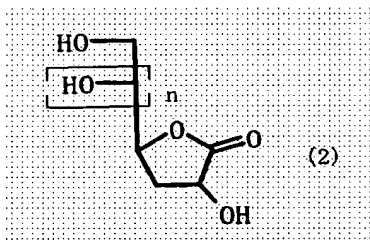
Instant claims are drawn to a method for preparing represented by the general formula (4),



comprising, (i) a step of the reduction from a compound represented by a general formula (1),

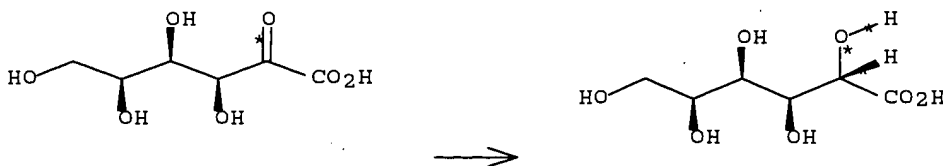


to a compound represented by the general formula (2) and/or the general formula (3),

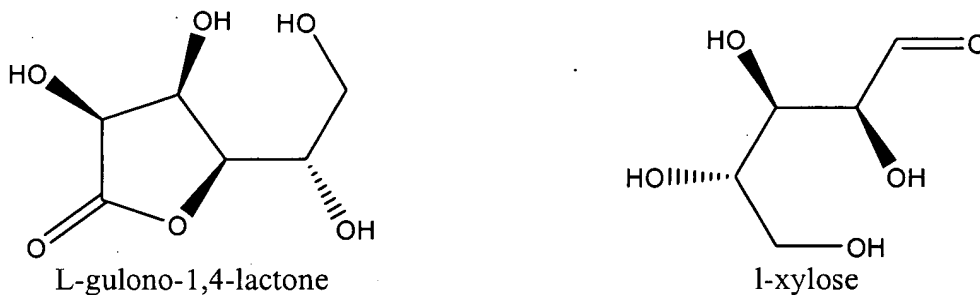


and (ii) a step of the decarboxylation of compound represented by formula (2) and/or formula (3) to a compound represented by formula (4). The reduction step is carried out in the solvent water, by using the catalytic hydrogenation, and a hydride reducing agent.

Heikkilä et al teaches a hydrogenation of 2-keto-L-gulonic acid to L-gulonic acid using Raney-nickel as a catalyst in a solvent water [see example 4].

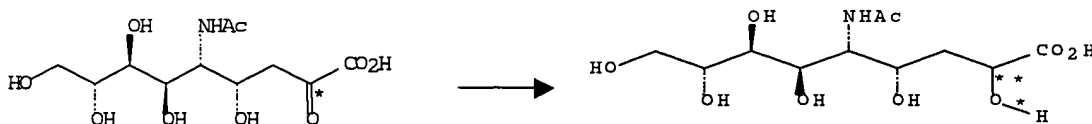


Heikkilä et al also teaches a decarboxylation of L-gulono-1,4-lactone to L-xylose [see example 6].

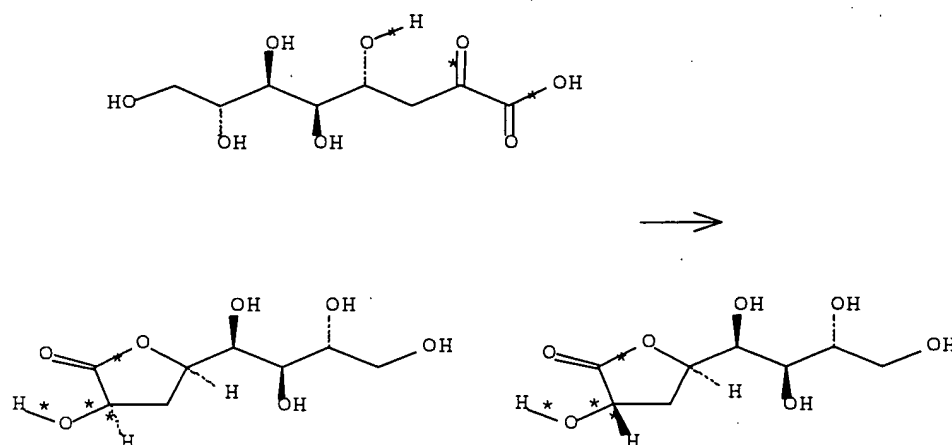


The difference between the instant invention and **Heikkilä et al** is the additional OH group(s) in the reactant(s) and consequently on the product. Other differences are the instant invention used sodium borohydride as a reducing agent and Pd-C used for the catalytic hydrogenation.

With regard to the reducing agent, **Ooi et al** teaches the use of sodium borohydride in the reduction of N-acetylneuraminic acid [see STN abstract].



Garegg et al also teaches the use of sodium borohydride in the reduction of sugars [see STN abstract].



The catalytic hydrogenation, and decarboxylation methods are known in the art. For example, **Rylander et al** teaches the hydrogenation of aldehydes and ketones using various metal catalyst and solvents, which are applicable to the compounds of instant claims. **Heikkilä et al** teach hydrogenation and decarboxylation of sugars, where as **Ooi et al** and **Garegg et al** teach the use of reducing agents and catalysts in hydrogenation reactions.

Therefore, it would have been obvious to a person of ordinary skill in the art, at the time of present invention was made, to have combined the teachings of **Heikkilä et al**, **Ooi et al** and **Garegg et al** with the generic teachings available in the art, various metal catalysts in the hydrogenation reactions, to make 2-deoxyaldoses with a

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reasonable expectation of success. Catalysts and reducing agents are interchangeable and it is standard practice in the chemical synthesis.

Modifying such processes is prima facie obvious because an ordinary artisan would be motivated to use known processes from the art for the existing methods to make the process more efficient or explore economical advantages over the other, since it is within the scope to optimize the conditions through routine experimentation.

Conclusion

5. No claim is allowed.
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhakar Katakam whose telephone number is 571-272-9929. The examiner can normally be reached on M-F 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SK


PETER O'SULLIVAN
PRIMARY EXAMINER
GROUP 1200